

Message Text

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ORIGIN PM-04

INFO OCT-01 EUR-12 ISO-00 COME-00 INT-05 OES-07
CIAE-00 INR-07 NSAE-00 L-03 /039 R

DRAFTED BY OSD/ISA/FMRA:JREINERTSON;PM/ISO:PSCHLAMM:DME
APPROVED BY PM/ISO:GTCHURCHILL
EUR/CE:KKURZE

-----132045Z 053211 /73

R 131804Z JUN 77
FM SECSTATE WASHDC
TO AMEMBASSY BONN
INFO SECDEF/ARPA

UNCLAS STATE 136166

E.O. 11652: N/A

TAGS: MARR, TPHY, GW

SUBJECT: SEISMIC RESEARCH OBSERVATORIES PROGRAM

1. DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (ARPA) AS PART OF A CONTINUING UNCLASSIFIED SEISMIC VERIFICATION RESEARCH EFFORT IS CONDUCTING THROUGH THE US GEOLOGICAL SURVEY (USGS) A SEISMIC RESEARCH OBSERVATORY (SRO) PROGRAM. THE SRO PROGRAM IS DESIGNED TO PROVIDE AN IMPROVED WORLDWIDE DATA BASE FOR FUTURE RESEARCH ON IDENTIFICATION OF SEISMIC EVENTS. THIS WILL BE DONE BY INSTALLING SRO EQUIPMENT IN ABOUT 13 COUNTRIES WHICH ARE CURRENTLY PARTICIPATING IN THE 117 STATION WORLD WIDE STANDARD SEISMOGRAPH NETWORK (WWSSN). THE WWSSN WAS ESTABLISHED UNDER ARPA SPONSORSHIP IN 1962 AND THE SRO PROGRAM IS CONSIDERED AN IMPROVEMENT OR MODERIZATION OF THE WWSSN. THE SRO STATIONS WILL INCLUDE IMPROVED SYSTEMS FOR RECORDING SHORT-PERIOD AND LONG-PERIOD SEISMIC WAVES AND WILL SUPPLEMENT DATA NOW AVAILABLE FROM THE WWSSN STATIONS AS WELL AS FROM NATIONAL NETWORKS AND EXPERIMENTAL UNCLASSIFIED

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STATIONS LOCATED IN MANY COUNTRIES. THE DATA FROM SRO STATIONS WILL BE UNCLASSIFIED AND WILL BE AVAILABLE TO ALL SEISMOLOGISTS.

2. TECHNICAL PLAN. IN IMPLEMENTING THE SRO PROGRAM, USGS CONTACTS THE LOCAL GOVERNMENT ORGANIZATION WHICH IS

RESPONSIBLE FOR SEISMOLOGICAL RESEARCH OR A GOVERNMENT SPONSORED SEISMIC NETWORK. IN THE CASE OF THE FRG THIS WILL BE THE CENTRAL SEISMOLOGICAL OBSERVATORY, 1-3 KRANKENHAUSSTR., ERLANGEN. EQUIPMENT WILL BE INSTALLED AND PLACED IN OPERATIONAL CONDITION BY A TEAM OF THREE TO FIVE US CONTRACTOR PERSONNEL. LOCAL ORGANIZATION PERSONNEL WILL OPERATE STATIONS AND, IF NECESSARY, WILL BE TRAINED IN THE US. TITLE TO ALL EQUIPMENT WILL BE TRANSFERRED BY USGS TO LOCAL ORGANIZATION AT THE TIME OF TRANSFER OF OPERATIONAL RESPONSIBILITY TO THAT ORGANIZATION. LOCAL ORGANIZATION IS EXPECTED TO PROVIDE WITHOUT CHARGE A SITE LOCATION WHICH WILL MEET THE REQUIREMENTS OF THE SRO PROGRAM. SITE LOCATION IS TO BE AGREED UPON BETWEEN LOCAL ORGANIZATION AND USGS REPRESENTATIVE. IT IS EXPECTED THAT SRO AND TEST EQUIPMENT MAY BE IMPORTED CUSTOMS AND DUTY FREE. COST OF EQUIPMENT AND TRAINING WILL BE BORNE BY USGS.

3. SITES WHERE SRO INSTALLATIONS ARE COMPLETE OR UNDERWAY ARE: ANKARA, TURKEY, WELLINGTON, NEW ZEALAND; MUNDARING, AUSTRALIA; MASHAD, IRAN; QUETTA, PAKISTAN; SHILLONG, INDIA; BOGOTA, COLUMBIA; CHIANG MAI, THAILAND; TAIPEI, TAIWAN; BANGUI, CENTRAL AFRICAN REPUBLIC; GUAM, AND ALBUQUERQUE, NEW MEXICO.

4. EMBASSY IS REQUESTED TO OUTLINE SRO PROGRAM TO FRG OFFICIALS AND OBTAIN APPROVAL IN PRINCIPLE FOR ESTABLISHMENT OF SRO STATION IN FRG. LETTER FROM USGS TO FRG CENTRAL SEISMOLOGICAL OBSERVATORY WILL BE TRANSMITTED UNCLASSIFIED

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SHORTLY TO EMBASSY FOR FORWARDING. LETTER WILL OUTLINE SRO PROPOSAL AND ESTABLISH INITIAL CONTACT.

5. ADDITIONAL INFORMATION ON SEISMIC RESEARCH OBSERVATORIES (SRO) PROGRAM.

THE SRO PROGRAM IS PART OF THE OVERALL ARPA PROGRAM OF SEISMIC VERIFICATION RESEARCH DESIGNED TO IDENTIFY AND RESOLVE THE REMAINING PROBLEMS IN IDENTIFYING SEISMIC EVENTS IN SUPPORT OF THE OBJECTIVE OF AN ADEQUATELY VERIFIED COMPREHENSIVE NUCLEAR TEST BAN TREATY.

UNDERGROUND DISTURBANCES CREATE BOTH BODY AND SURFACE WAVES. BODY WAVES OF RELEVANCE ARE COMPRESSIONAL WAVES WHICH SPREAD OUT FROM THE DISTURBANCE IN THE SAME WAY THAT SOUND SPREADS FROM A SOURCE IN THE ATMOSPHERE. BODY WAVES PROPAGATE THROUGH THE INTERIOR OF THE EARTH. SURFACE WAVES TRAVEL ALONG THE SURFACE OF THE EARTH IN MUCH THE SAME MANNER AS WAVES CAUSED BY A STONE THROWN INTO A POND.

IN ADDITION TO WAVES CREATED BY SPECIFIC DISTURBANCES UNDERGROUND, THERE IS A CERTAIN AMOUNT OF BACKGROUND SEISMIC "NOISE," WHICH IS CONSTANTLY PRESENT AT THE EARTH'S SURFACE. NEAR POPULATED AREAS, BACKGROUND SEISMIC NOISE IS PRODUCED LARGELY BY TRAFFIC AND INDUSTRY.

IN NON-POPULATED AREAS, THIS SEISMIC NOISE IS PRODUCED BY ATMOSPHERIC ENERGY IMPACTING UPON THE GROUND IN VARIOUS WAYS. PROPER SITING OF INSTRUMENTS CAN MINIMIZE BUT NOT ELIMINATE, THIS NOISE.

THE NEW DATA AND DATA FORMAT RESULTING FROM THE SRO PROGRAM WILL ALLOW EXTENSIVE TESTING OF VARIOUS SOPHISTICATED SEISMIC SOURCE IDENTIFICATION CRITERIA NOT EASILY EVALUATED WITH PRESENTLY AVAILABLE DATA. THE SRO PROGRAM WILL USE NEW BROAD BAND SEISMOMETERS IN RELATIVELY DEEP (100 METERS) BOREHOLES TO MINIMIZE THE EFFECTS OF THE SURFACE-INDUCED UNCLASSIFIED

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SEISMIC NOISE.

AN ADDITIONAL FEATURE OF THE SRO INSTRUMENTATION WILL BE ITS ABILITY TO RECORD DATA OVER A WIDE AMPLITUDE RANGE. BECAUSE OF GREATER EASE OF HANDLING AND ANALYSIS OF DIGITAL DATA (IN CONTRAST TO ANALOG DATA), RELATIVELY SOPHISTICATED EQUIPMENT WITH DIGITAL RECORDERS IS USED IN THE SRO SYSTEM. THIS EQUIPMENT DETERMINES WHETHER A SMALL OR LARGE SIGNAL IS BEING SENSED AND AUTOMATICALLY SETS ITSELF TO RECORD THE EVENT WITHIN THE PROPER RANGE OF THE RECORDING SYSTEM.

HOST COUNTRY BENEFITS. THERE ARE TWO MAIN AREAS IN WHICH THE HOST COUNTRY STANDS TO GAIN BY PARTICIPATING IN THE SRO PROGRAM. THE FIRST IS THAT THE SYSTEM IS BEING SPECIALLY DESIGNED TO PROVIDE ON-SITE VISUAL RECORDING FOR USE BY LOCAL SPONSORING OBSERVATORIES OR UNIVERSITIES FOR THE STUDY OF LOCAL AND DISTANT EARTHQUAKE PHENOMENA. IN ADDITION TO THIS, PARTICIPATING AGENCIES WILL BE ABLE TO OBTAIN ON REQUEST COPIES OF DATA FROM THE OTHER SITES AS IS THE CASE IN THE WWSSN PROGRAM. SINCE SEISMOLOGISTS IN THE FRG HAVE EQUIPMENT CAPABLE OF USING THE DIGITAL MAGNETIC TAPES, THESE OF COURSE WOULD BE AVAILABLE IF REQUESTED. THE SECOND AREA INVOLVES THE NEW EQUIPMENT WHICH HAS BEEN DESIGNED FOR THE PROJECT. THE PERSONNEL WHO WILL BE OPERATING THE EQUIPMENT WILL RECEIVE TRAINING IN THE US, IF REQUIRED, AND THUS GAIN VALUABLE EXPERIENCE AND EXPERTISE IN THE OPERATION AND MAINTENANCE OF ADVANCED ELECTRONIC TRANSMISSION AND RECORDING EQUIPMENT. A THIRD BUT LESS TANGIBLE BENEFIT IS THE OPPORTUNITY TO PARTICIPATE IN AN ADVANCED PROGRAM OF RESEARCH IN SUPPORT OF THE

OBJECTIVE OF AN ADEQUATELY VERIFIED CTB. VANCE

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Message Attributes

Automatic Decaptioning: X
Capture Date: 01-Jan-1994 12:00:00 am
Channel Indicators: n/a
Current Classification: UNCLASSIFIED
Concepts: SEISMOLOGY, RESEARCH, PROGRAMS (PROJECTS)
Control Number: n/a
Copy: SINGLE
Sent Date: 13-Jun-1977 12:00:00 am
Decaption Date: 01-Jan-1960 12:00:00 am
Decaption Note:
Disposition Action: n/a
Disposition Approved on Date:
Disposition Case Number: n/a
Disposition Comment:
Disposition Date: 01-Jan-1960 12:00:00 am
Disposition Event:
Disposition History: n/a
Disposition Reason:
Disposition Remarks:
Document Number: 1977STATE136166
Document Source: CORE
Document Unique ID: 00
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Enclosure: n/a
Executive Order: N/A
Errors: N/A
Expiration:
Film Number: D770210-1074
Format: TEL
From: STATE
Handling Restrictions: n/a
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Message ID: f91f4f7e-c288-dd11-92da-001cc4696bcc
Office: ORIGIN PM
Original Classification: UNCLASSIFIED
Original Handling Restrictions: n/a
Original Previous Classification: n/a
Original Previous Handling Restrictions: n/a
Page Count: 4
Previous Channel Indicators: n/a
Previous Classification: n/a
Previous Handling Restrictions: n/a
Reference: n/a
Retention: 0
Review Action: RELEASED, APPROVED
Review Content Flags:
Review Date: 22-Oct-2004 12:00:00 am
Review Event:
Review Exemptions: n/a
Review Media Identifier:
Review Release Date: n/a
Review Release Event: n/a
Review Transfer Date:
Review Withdrawn Fields: n/a
SAS ID: 2173327
Secure: OPEN
Status: NATIVE
Subject: SEISMIC RESEARCH OBSERVATORIES PROGRAM
TAGS: MARR, TPHY, GE, ARPA, WWSSN
To: BONN
Type: TE
vdkgvwkey: odbc://SAS/SAS.dbo.SAS_Docs/f91f4f7e-c288-dd11-92da-001cc4696bcc
Review Markings:
Margaret P. Grafeld
Declassified/Released
US Department of State
EO Systematic Review
22 May 2009
Markings: Margaret P. Grafeld Declassified/Released US Department of State EO Systematic Review 22 May 2009